

## Remarks

### Status of Claims

Claim 20-35 are pending in this application. Claims 1-19 were previously cancelled. Claims 28-35 were withdrawn from consideration by election. Claims 20-27 are rejected under 35 USC 103(a) as follows.

### Rejection of Claims under 35 USC 103(a)

Claims 20 and 21 are rejected as being unpatentable over Hull in view of Herbst.

Claims 22 and 23 are rejected as being unpatentable over Hull in view of Herbst as applied to claim 20, and further in view of Harnisch, B. "Ultra-lightweight C/SiC Mirror and Structures".

Claims 24 and 27 are rejected as being unpatentable over Hull in view of Herbst and Jutte.

Claim 26 is rejected as being unpatentable over Hull in view of Herbst and Jutte and further in view of Harnisch, B.

Concerning Herbst, the Examiner points out that it would be obvious to combine the features disclosed by Hull with the feature "material that has specific thermal expansion properties that compensate for the thermal properties of the image lenses (col. 1, lines 54-57).

### Arguments Regarding the Rejections

It is noted that the rejections are based upon Hull in view of Herbst.

Applicant wishes to make two points regarding the Examiner's view of the above quote:

- 1) The word “compensate” does not automatically mean “same amount of displacement”. It simply means “a certain amount”.
- 2) Herbst’s col. 1, lines 58-61 point out that such compensation devices have a lot of negative properties: “such traditional image lens compensation devices tend to increase system complexity, and thus cost....”
- 3) Consequently, Hull would not use Herbst because of the negative properties cited in Herbst.

Regarding claims 20 and 24, Applicant draws attention to the feature “said compensating elements being arranged in a region of said first optical element providing thermal conductivity from said first optical element to said compensating means”.

Hull discloses support struts with heating elements that are arranged far from primary mirror 13. Hull has no need to arrange near the first optical element because temperature sensors are involved and an active heating system. Such an active heating system is quite vulnerable to malfunction. While it could be repaired when used on planet Earth, this is not an option when used in orbit. Here, a stable, passive system is needed that can run for years.

Herbst (col 1, lines 54-57) states that in traditional thermal imaging systems, a passive device can be implemented. It is not stated where such a device can be implemented. The thermal imaging systems are to be used on Earth, for example, in armored vehicles. Such thermal imaging system does not experience the strain of a telescope used in orbit.

Regarding claim 21, the Examiner states that Hull (col. 4, lines 7-9) discloses a lens 11. Applicant respectfully has difficulty following the Examiner’s argument. Lines

7-9 disclose a secondary mirror 14, a primary mirror 13, support struts 17 and an input window 11. Applicant wishes to make the following points:

- 1) There seems to be a problem with the numbers. In Figure 1, number 11 shows part of the telescope housing. Number 13 is already used for the primary mirror and described as a cavity in column 4.
- 2) There is no lens seen in Figure 1. Further, a lens is not needed. As already noted in our Amendment After Final Action, an input window normally is simply an opening. There is no disclosure of a lens.

All features of a claim need to be shown in a Figure. Applicant therefore respectfully requests that the Examiner show us where the lens in question appears in the drawings, so that we may further discuss this subject.

Regarding claim 22, the Examiner states that Harnisch (page 4) discloses the use of C/C SiC with a density of  $2.23 \times 10^3 \text{ kg/m}^3$  to construct the mounting means of a telescope. Applicant is unable to find this disclosure, and respectfully requests the Examiner tell us where this is disclosed so that we may further discuss this subject. According to our reading of page 4, page 4 discloses an Ultra-Lightweight Scanning mirror made of C/SiC. Mounting means are not disclosed. Further in claim 22, a material of a density of at least  $2.5 \times 10^3 \text{ kg/m}^3$  is claimed, whereas the Examiner states that the material has a density of  $2.23 \times 10^3 \text{ kg/m}^3$ , which is less than claimed in claim 22 of the present application.

#### New Claims Included in this Amendment

In new claim 36, the mounting comprises C/C SiC. C/C SiC was found in original claim 14, and is disclosed in paragraph [0021] of the specification. C/C SiC is

not disclosed in Hull or Harnisch. Harnisch discloses C/SiC, which differs from C/C SiC of the present application. With C/C SiC, an expansion coefficient of  $<0.5 \times 10^{-6}$  (e-modules about 90 GPa) can be achieved. Harnisch's C/SiC cannot reach an amount of less than  $2 \times 10^{-6}$  (e-modulus about 250 GPa). C/SiC is very brittle. Therefore, it cannot be used for filigree structures. Even thinner mountings that are flexible cannot be made with C/SiC. When a mounting made of C/SiC is already broken, then C/C SiC still shows intact fibers because C/C SiC is less brittle than C/SiC. Therefore, C/C SiC can be used for filigree elements, e.g., tubes. With C/C SiC, very thin structures can be generated from fiber mats as perform.

Regarding new claims 38, Hull discloses mirror elements in the struts that are not connected to the mounting or mirror mounting.

Regarding new claim 40, Hull's mirror are made of aluminum.

Regarding new claim 41, there is no titanium in Hull's disclosure.

Regarding new claim 42, there is no SiN in Hull's disclosure.

Contrary to the combined cited art, as discussed above, the current invention achieves a robust optical system for a telescope in orbit.

#### Payment of Fees

Claims 1-19 were cancelled. Claims 20-35 were under examination prior to this Amendment. Claims 36-42 have been added in this Amendment, making two claims over twenty. Therefore, an additional claims fee for two claims (\$100 - \$50 per claim) is submitted herewith.

#### Information Disclosure Statement

Applicant respectfully requests that the Examiner review all documents previously submitted in Information Disclosures for this application.

A new Information Disclosure Statement is submitted herewith, with copies of the references cited therein. It should be noted that DE 43 26 762 and US 5,5798,333 were cited by the Examiner on March 6, 2003.

A three-month extension of time in which to respond to the outstanding Office Action is hereby requested. PTO-2038 authorizing credit card payment for the amount of \$1,020 is enclosed for the prescribed Large Entity three-month extension fee, as well as \$100 for two new claims over twenty, and a \$180 Information Disclosure Fee, for a total of \$1,300 to be charged to the credit card.

Wherefore, further consideration and allowance of the claims is respectfully requested.

Respectfully submitted,



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M. Robert Kestenbaum